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(12) UK Patent Application (19) GB (11) 2 191 320 (13) A

(43) Application published 9 Dec 1987

(21) Application No 8710772

(22) Date of filing 7 May 1987

(30) Priority data

(31) 863511

(32) 15 May 1986

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(51) INT CL^a

G08B 5/38 A46D 1/04 A48B 15/00

(52) Domestic classification (Edition I):

G4F AA

AAK BX

A4V 14A3 14A4 14A5C

U18 1124 2091 2196 A4K A4V G4F

(56) Documents cited

GB A 2154408

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GB 1442807

GB 0953429

(58) Field of search

G4F

A4V

Selected US specifications from IPC sub-class G08B

(54) Ready lights for electrical curling irons and brushes

(57) An electric curling iron with an elongated barrel (14) emanating from the front of a handle (12) has combs (18) made up of several teeth (20) around the barrel (14), and within the barrel a tubular heating element (22). A pair of spaced lamps (L1, L2) and a switch (S1) are connected to logic circuitry so that, when the hair grooming appliance is turned on, one lamp L1 is turned on (by V+ on line 70) and remains on while an RC circuit (27) is reaching its operating level. After a predetermined period set by the charging of a capacitor within the RC circuit (27), the two lamp lights (L1, L2) begin to blink alternately within the appliance. The delay in the operation of the RC circuit (27) is prechosen so that it coincides with the amount of time necessary to bring the heating element (22) to its operating temperature.

FIG. 2

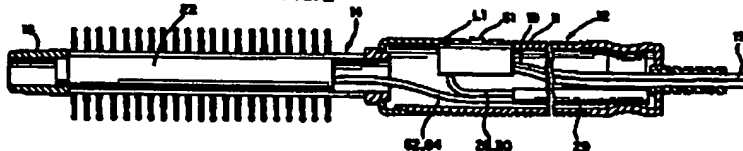
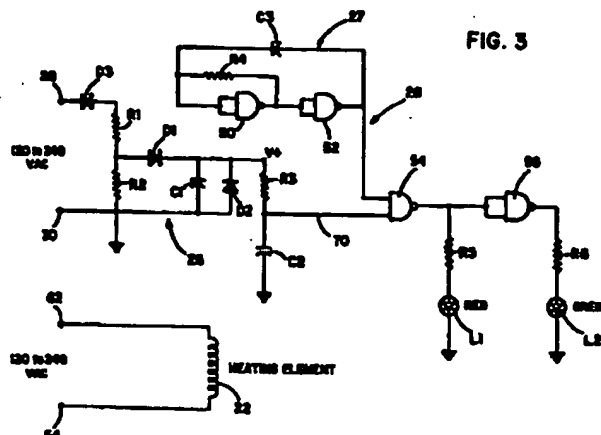


FIG. 3



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FIG. 1

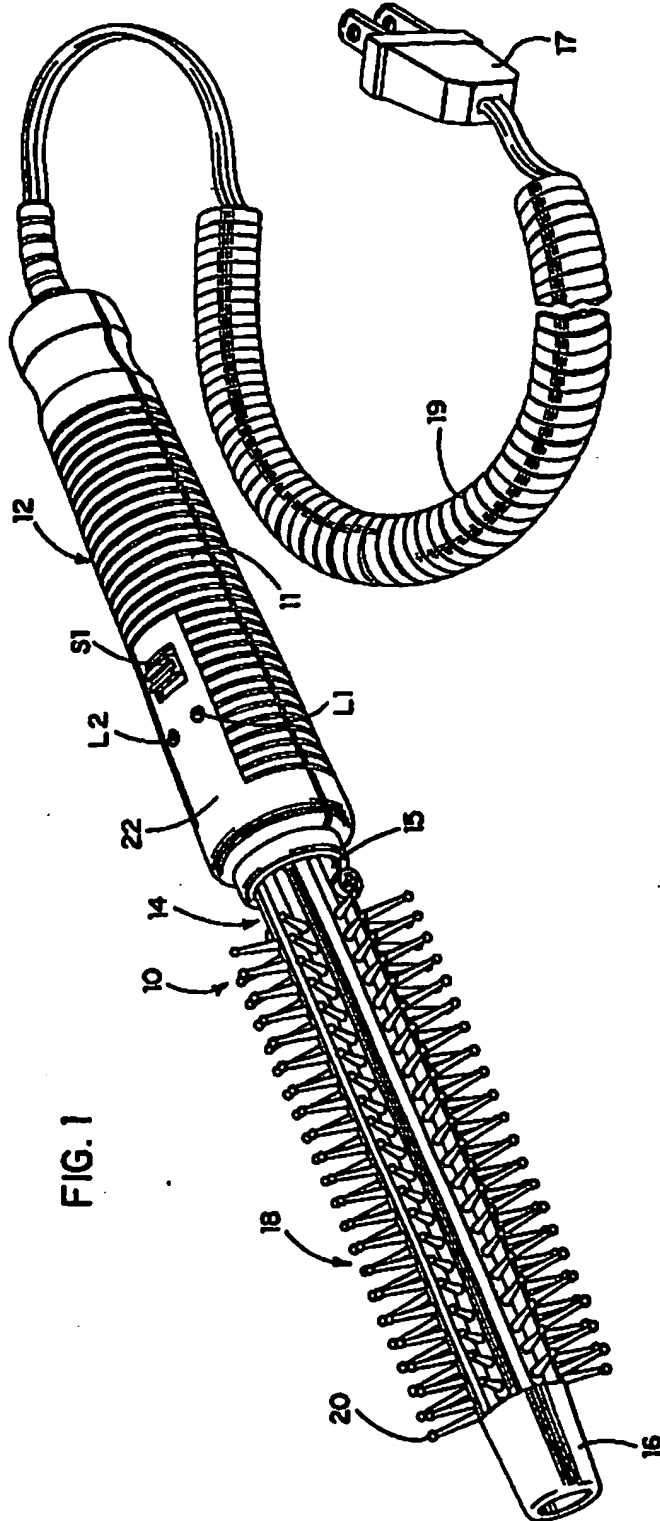
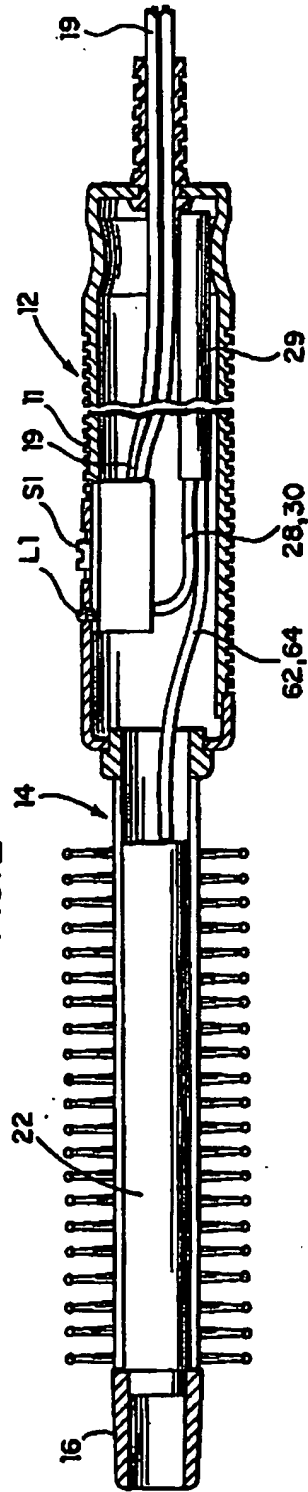


FIG. 2



SPECIFICATION

Ready lights for electrical curling irons and brushes

5

Field of the Invention

The present invention relates to a system for letting a user know when a hair grooming appliance is ready for use, in general, and to a blinking light circuit used in conjunction with hair grooming appliances such as curling irons and hair brushes, in particular.

Background of the Invention

In prior art electrical hair grooming appliances such as heated hair brushes and curling irons, it is almost universally necessary to let the user know when the heating element in the grooming appliance has reached the appropriate operating temperature so that the appliance may be used to curl or brush the hair. In most prior art systems, after a switch is thrown in order to activate the appliance, a temperature sensor mounted within the appliance senses the change in temperature of the heating element. When the heating element reaches a predetermined temperature, the temperature sensor sends a signal to circuitry mounted within the appliance. This circuitry activates a ready light to let the user know that the heating element within the hair grooming appliance has reached its operating temperature and may be used for its intended purpose.

In prior art hair grooming appliances, because of the prior art schemes that employ a constant ready light, there is no easy way to let the user know that the hair grooming appliance is both functioning properly and ready for use. There is thus a need for a system which clearly and dramatically lets the user of an electrical hair grooming appliance know when the appliance has reached its operating temperature and is ready for operation. The present invention is directed toward filling that need.

Summary of the Invention

An electric curling iron embodying the teachings of the present invention generally consists of an elongated handle portion. An elongated barrel of reduced diameter emanates from the front of the handle. A plurality of longitudinal extending combs made up of several teeth radiate around the barrel. Contained within the barrel is a tubular heating element. In a preferred embodiment, the heating element is in the form of a positive temperature coefficient heating element. Near the forward portion of the handle is a panel which contains a pair of spaced lamps and a switch. In a preferred embodiment, the first lamp is a red light emitting diode and the second lamp is a green light emitting diode.

Circuitry which is positioned on a printed

circuit board and contained within the lower portion of the handle basically comprises a power supply and a light blinking circuit. The power supply receives current from a 120 to 240 volt ac source. Through the arrangement of the switch, the input voltage is supplied to the heating element through and at the same time the voltage is applied to the input terminals and of the power supply.

Through logic circuitry, when the hair grooming appliance is turned on, the red light is turned on and remains on while an RC circuit is reaching its operating level. After a predetermined period set by the charging of a capacitor within the RC circuit, the red and green lights begin to blink alternately within the hair grooming appliance. The delay in the operation of the RC circuit is prechosen so that it coincides with the amount of time necessary to bring the heating element to its operating temperature.

It is thus a primary object of the present invention to provide a ready indicator for use in hair grooming appliances such as curling irons and hair brushes.

It is another object of the present invention to provide a system that clearly indicates when an electrical hair grooming appliance has been turned on and when it is ready to use.

Other objects and advantages of this invention will further become apparent hereinafter and in the drawings in which:

Brief Description of the Drawings

Figure 1 is a perspective view showing an electric hair curling iron incorporating the teachings of the subject invention.

Figure 2 is a cross-sectional view partially in schematic showing the major elements positioned inside of the hair curling iron of Figure 1.

Figure 3 is a circuit diagram showing the circuit elements found in a preferred embodiment of the subject invention.

Detailed Description of the Preferred Embodiments

In describing a preferred embodiment of the invention illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

With reference to Figures 1 and 2, an electric curling iron is generally designated as 10. This iron consists of an elongated handle portion 12 having a gripping area 11 and a control panel 22. The handle is made of an electrically insulated material such as plastic. An elongated barrel 14 of reduced diameter emanates from the front of the handle 12. The barrel terminates in a forward cap portion 16

having the shape of a truncated cone and made of an insulated material such as plastic. A plurality of longitudinally extending combs 18 made up of several teeth 20 radiate
 5 around the barrel. Contained within the barrel is a tubular heating element 22. In a preferred embodiment, the heating element is in the form of a positive temperature coefficient (PTC) heating element or other type of tem-
 10 perature compensating heating element. PTC heating elements are particularly desirable because they automatically vary voltage to maintain a predesigned temperature. This allows them to function without the use of a ther-
 15 mostat or a temperature protector. Positioned about the barrel and between the combs are heat conducting metallic strips 15 which are in heat conducting relationship with the exterior surface of the tubular heating element.
 20 Near the forward portion of the handle 12 is panel 22 which contains a pair of spaced lamps L1 and L2 and a side switch S1. In a preferred embodiment, lamp L1 is a red light emitting diode and lamp L2 is a green light
 25 emitting diode.

With reference to Figure 3, circuitry which is positioned on a printed circuit board 29 and contained within the lower portion of handle 12 is shown. The circuitry basically comprises
 30 a power supply 26 and a light blinking circuit 28. The power supply consists of a pair of input terminals 28 and 30 which receive current from a 120 to 240 volt ac source such as a normal household receptical. The current
 35 is routed from the receptical through a conventional plug 17 and wire 19 to the terminals 28-30 and the terminals 62-64 of heating element 22 under the control of switch S1.

A pair of resistors R1 and R2 are connected
 40 in series across terminals 28 and 30. A diode D3 is positioned between resistor R1 and terminal 28 for protection against overheating. Terminal 30 is also grounded. The junction of resistors R1 and R2 provides a connection for
 45 the anode of a rectifier diode D1 which in turn has its cathode connected to the parallel arrangement of capacitor C1, diode D2 and resistor R3. Resistor R3 is also connected to ground via capacitor C2. The junction of cap-
 50 acitor C2 and resistor R3 is connected to one input of a dual-input NAND gate 54.

The two inputs of dual-input NAND gate 50 are connected to each other. The output of NAND gate 50 is connected to the two inputs
 55 of dual-input NAND gate 52. The output of dual-input NAND gate 52 is fed into the free input of NAND gate 54 and also through a feedback capacitor C3 to the joined inputs of NAND gate 50. A feedback resistor R4 is po-
 60 sitioned between the joined inputs and the output of NAND gate 50. The output of NAND gate 54 is fed through resistor R5 to light emitting diode L1 which is grounded. At the same time, the output of NAND gate 54
 65 is fed to the inputs of dual-input NAND gate

56 which are tied to each other. In turn, the output of NAND gate 56 is fed through resistor R6 to light emitting diode L2 which is grounded. Through the arrangement of switch
 70 S1, the input voltage is supplied to heating element 22 through terminals 62 and 64 at the same time that the voltage is applied to the input terminals 28 and 30 of the power supply 26.

Power supply 26 provides an input signal of approximately 1.7 to 2 volts on line 70 to NAND gate 54. This produces a logic 1 at the input. Because the delay circuit 27 has not become active, the other input at NAND gate
 80 54 is a logic 0. This produces a logic 1 at the output of the NAND gate which activates the red light L1 and puts two logic ones into the input of NAND gate 56. This in turn produces a zero output at NAND gate 56. Thus, green
 85 light L2 remains inactive. As soon as the capacitor of the RC circuit 27 has become fully charged after a predetermined period of approximately 120 to 180 seconds, the RC circuit 27 produces a logic one input at NAND
 90 gate 54. This produces a logic zero at the output of NAND gate 54 thus causing light L1 to go out. The zero input to both of the inputs of NAND gate 56 produces a logic one output at NAND gate 56 causing the green
 95 light L2 to turn on. The RC circuit 27 then oscillates through the arrangement of NAND gates 50 and 52 to provide alternating logic ones and logic zeros at the input of NAND gate 54. This in turn causes the red and
 100 green lights to blink alternately as the outputs of NAND gates 54 and 56 change.

In this way, when the hair grooming appliance is turned on, the red light L1 is turned on and remains on while the RC circuit 27 is reaching its operating level. After a predeter-
 105 mined period set by the charging of the capacitor C3 within the RC circuit, lights L1 and L2 begin to blink alternately within the hair grooming appliance. The delay in the operation of the RC circuit 27 is prechosen so that it coincides with the amount of time neces-
 110 sary to bring the heating element 22 to its operating temperature. In this way, lights L1 and L2 are alternately triggered by a time-
 115 delay circuit and not by a temperature sensor in the grooming appliance. Such an arrangement is practical today because of the high reliability of today's positive temperature coefficient heating elements.

Although the invention has been described with reference to a specific embodiment, this description is not meant to be construed in a limiting sense. Various modifications of the disclosed embodiment, as well as other em-
 120 bodiments of the invention will become apparent to persons skilled in the art upon reference to the description of the invention. It is therefore contemplated that the appended claims will cover any such modifications or
 125 embodiments as fall within the true scope of
 130

the invention.

CLAIMS

1. A blinking light circuit comprising:
 - 5 a first light;
 - a second light;
 - first means for activating said first light;
 - second means for turning off said first light after a predetermined time period and turning
 - 10 on said second light; and
 - third means for alternately turning on and off said first and second lights after said predetermined period of delay.
2. The blinking light circuit of claim 1
- 15 wherein said first light is a red light emitting diode and said second light is a green light emitting diode.
3. The blinking light circuit of claim 1, wherein said third means includes a delay circuit for delaying the alternating operation of
- 20 said lights by said predetermined period.
4. The blinking light circuit of claim 3, wherein said third means includes an oscillating circuit for producing signals to control the
- 25 alternating operation of said light.
5. A hair grooming appliance comprising:
 - a handle;
 - an electrically heated grooming implement secured to said handle;
 - 30 first and second lights mounted in said handle;
 - first means for activating said first light;
 - second means for turning off said first light after a predetermined time period and turning
 - 35 on said second light; and
 - third means for alternately turning on and off said first and second lights after said predetermined period of delay.
6. The appliance of claim 5 wherein said
- 40 first light is a red light emitting diode and said second light is a green light emitting diode.
7. The appliance of claim 5, wherein said third means includes a delay circuit for delaying the alternating operation of said lights by
- 45 said predetermined period.
8. The appliance of claim 7, wherein said third means includes an oscillating circuit for producing signals to control the alternating operation of said lights.
- 50 9. The appliance of claim 5, wherein said first, second and third means are mounted in said handle.
10. A blinking light circuit constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
- 55 11. A hair grooming appliance constructed and arranged to operate substantially as hereinbefore described with reference to and as
- 60 illustrated in the accompanying drawings.